FURTHER ARCHAEOLOGICAL INVESTIGATIONS AT THE SETTLEMENT OF WAIWHAU, HAURAKI PLAINS

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Abstract. A University of Auckland Department of Anthropology archaeological field school carried out excavations at the site of Waiwhau in 1987 and again in 1988. These provided a site stratigraphy, and evidence of three main settlement phases: undefended, defended and undefended, followed by the use of the site as a burial ground. The emphasis was on dispersed settlement and temporary defensive measures, in contrast to the neighbouring densely occupied site at Raupa. Historic sources support an early protohistoric date for Waiwhau. Details from these sources correlate well with excavation findings.

The site of Waiwhau, T13/756 (N53/198), and the neighbouring site of Raupa, T13/13 (N53/37), occupy opposite sides of the Waihou River at its junction with the Ohinemuri, on the east side of the Hauraki Plains, at Paeroa.

Waiwhau and Raupa were originally investigated because flood protection work by the Hauraki Catchment Board threatened their destruction. After a preliminary excavation of both sites by Phillips in 1984 (Phillips 1986), it was decided that areal excavations were required to better understand and interpret their history. As a result, Waiwhau was subsequently excavated by the University of Auckland's field school in 1987 (Phillips 1988), when Nigel Prickett, Auckland Institute and Museum, began excavations on Raupa (Prickett 1990).

In February 1988 ten students led by Professor R. C. Green with the assistance of Rod Wallace, Liz Hudson and Caroline Phillips, all of Auckland University, undertook a second excavation at Waiwhau. Over the same period, Nigel Prickett directed further investigations at Raupa. As in the previous year the two excavations shared facilities and stayed at the Ngati Tamatera Te Pai-o-Hauraki marae, at Paeroa.

In New Zealand archaeology there was a period when attempts were made to integrate oral history of various Maori groups with the archaeological record (e.g. Duff 1956:18-20, Fig. 1). Usually these were conceived on a grand, or New Zealand-wide, scale. For the most part such studies have not proved very effective, and after criticism by Golson (1960) such broad-ranging interpretations have only occasionally been attempted (Groube 1970:153-55; Simmons 1969:6-8), again with little convincing success. However, individual sites, especially those dating to the late prehistoric or protohistoric periods, are often referred to in traditional histories, and if

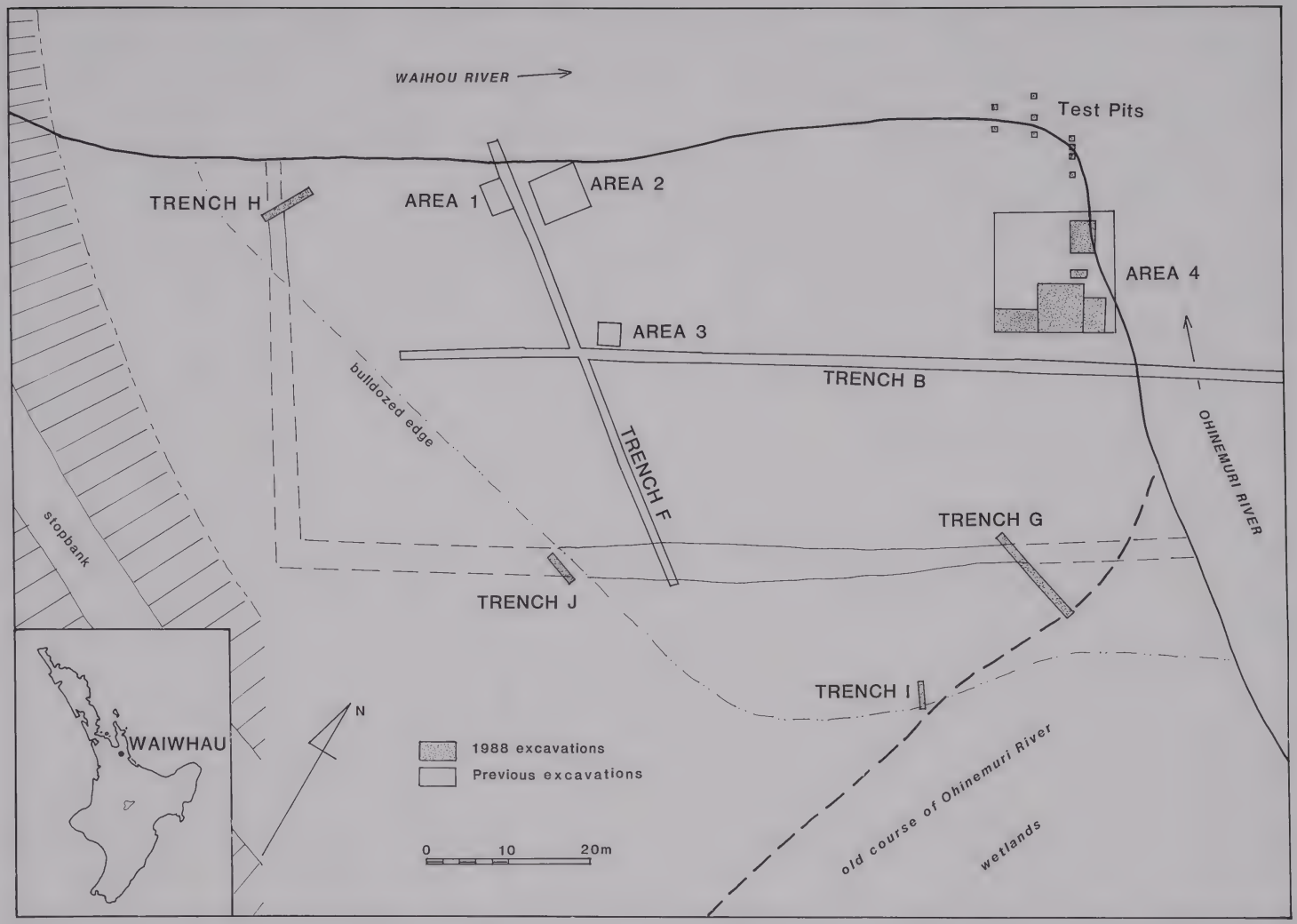


Fig. 1. Location of excavations at Waiwhau.

archaeological and traditional evidence are ever to be effectively integrated, it will be at this local level. Waiwhau, which is a protohistoric site, has proved suitable for the successful integration of these two kinds of evidence.

Several reasons existed for continuing the excavation programme at Waiwhau. Firstly, it provided a contrast to the intensely occupied and defended neighbouring site of Raupa. Moreover, as work was to continue at Raupa in 1988, investigation of Waiwhau could readily be carried out at the same time. This would help in the interpretation of both sites, as it was thought highly probable that at some periods occupation at the two sites was contemporary. Secondly, it was thought that further investigation would provide information on the rather obscure transition between the late prehistoric and early historic periods, shedding light on a time when European influence presumably had its greatest impact on Maori society. Thirdly, Waiwhau was well suited for a field school, because of its relatively straightforward stratigraphy. This consisted of a white base clay, dark occupation material in a variety of layers and lenses, and an overlay of bright yellow rock flour (derived from gold mining tailings). Lastly, additional excavation on the site in conjunction with documentary research would, it was hoped, shed light on the defences and the type of occupation in the early period of European contact.

THE EXCAVATION

The previous excavations of Areas 1, 2 and 3, during 1984 and 1987, had given some idea of the distribution and nature of occupation that existed on the site. The only place where there appeared to have been intense activity was at the eastern end of Trench B, near the original junction of the two rivers. This portion of the site was also physically lower, so that the stratigraphy had been less disturbed by subsequent ploughing. For these reasons, it was thought that this area would give new information concerning occupation at the site.

Area 4 was therefore laid out adjacent to Trench B (Fig. 1). Previous work (Phillips 1988) had suggested that the defences were insubstantial. Three trenches were opened up across the ditch to test this conclusion and to define the extent of the defended area. One of these trenches was placed where the ground sloped down the river banks and into wetlands at the site margins, to investigate the environment that existed when Waiwhau was occupied. Another trench was placed beyond the presumed limits of the ploughed paddock to study undisturbed cultural layers or the natural soil profile. Test pits were excavated to the north of Area 4 to determine the river bank edge of the site (Fig. 1).

All portable artefacts, as well as samples of midden, charcoal and soils, were removed for further analysis (Appendices 1-3).

AREA 4

The evidence of relatively intense occupation at the east end of Trench B consisted of several postholes, and layers of charcoal and shell midden, in a thicker deposit than had been encountered elsewhere on the site. Thus Area 4 was selected for areal excavation, specifically to uncover evidence of occupation and possible defence. The

deeper deposits should enable the development of a site chronology, and the location of the excavation would reveal the relationship of the site to the two rivers at their junction.

An area approximately 15 x 15 m was scraped by machine north of Trench B, to take off the overlying rock flour and most of the ploughed zone. The entire area was covered with scattered midden, and strips of midden and rock flour could be seen corresponding to the ploughing lands encountered previously at the western end of the site (Phillips 1988:66, Fig. 11). The surface underneath the disturbed zone revealed three areas of different character: to the north-east was an area containing deeper rock flour; to the south-west was an area of particularly dense midden and fire-cracked cooking stones; and to the south-east was an area of darker soil but less midden. Excavations designed to sample these three areas were laid out and uncovered by hand.

The resulting excavations revealed up to eight phases of occupation. These phases occurred before the episodes, which had been recorded over the entire site, of flooding (depositing rock flour), ploughing, further flooding and topsoil development.

Area 4i

To the south-east a 6 x 6 m square was opened up adjacent to postholes seen in Trench B. The eastern 3 m was not fully excavated when testing showed it to drop very steeply to the Ohinemuri River. The square was later extended 2.5 m to connect with Area 4ii.

Phases 1-3. In this square, the original occupation surface had been formed by clearing the topsoil and subsoil and exposing the underlying base clay in which the early features could be seen. For this reason the number of phases and the original depth and association of features could not be determined with certainty. There were a great many post and stakeholes in the centre and east side of the square from which a few alignments could be identified.

At least three early construction phases can be defined. The first features (Fig. 2) included a bin pit 1.3 x 0.6 m, 180 mm deep; two drains or bedding trenches 120 mm wide, 100 mm deep, which flowed at a gradient measured between 1° and 2° from the north-west to south-east; a small hollow, 300 x 250 mm, 260 mm deep; and three possible posthole alignments which may have related to a house.

The second phase (Fig. 2) included a drain, 250 mm wide and up to 150 mm deep, which flowed down from Area 4ii eastwards towards the Ohinemuri River at a slope of 3°. A shallower side drain joined this from the north.

The third phase included the deepening of the early drain by about 50 mm (Fig. 3). Two postholes, aligned with another pair in Area 4ii, may have formed part of a structure associated with the drains. Three other postholes (500-700 mm deep), may possibly have belonged to a pataka (above ground store).

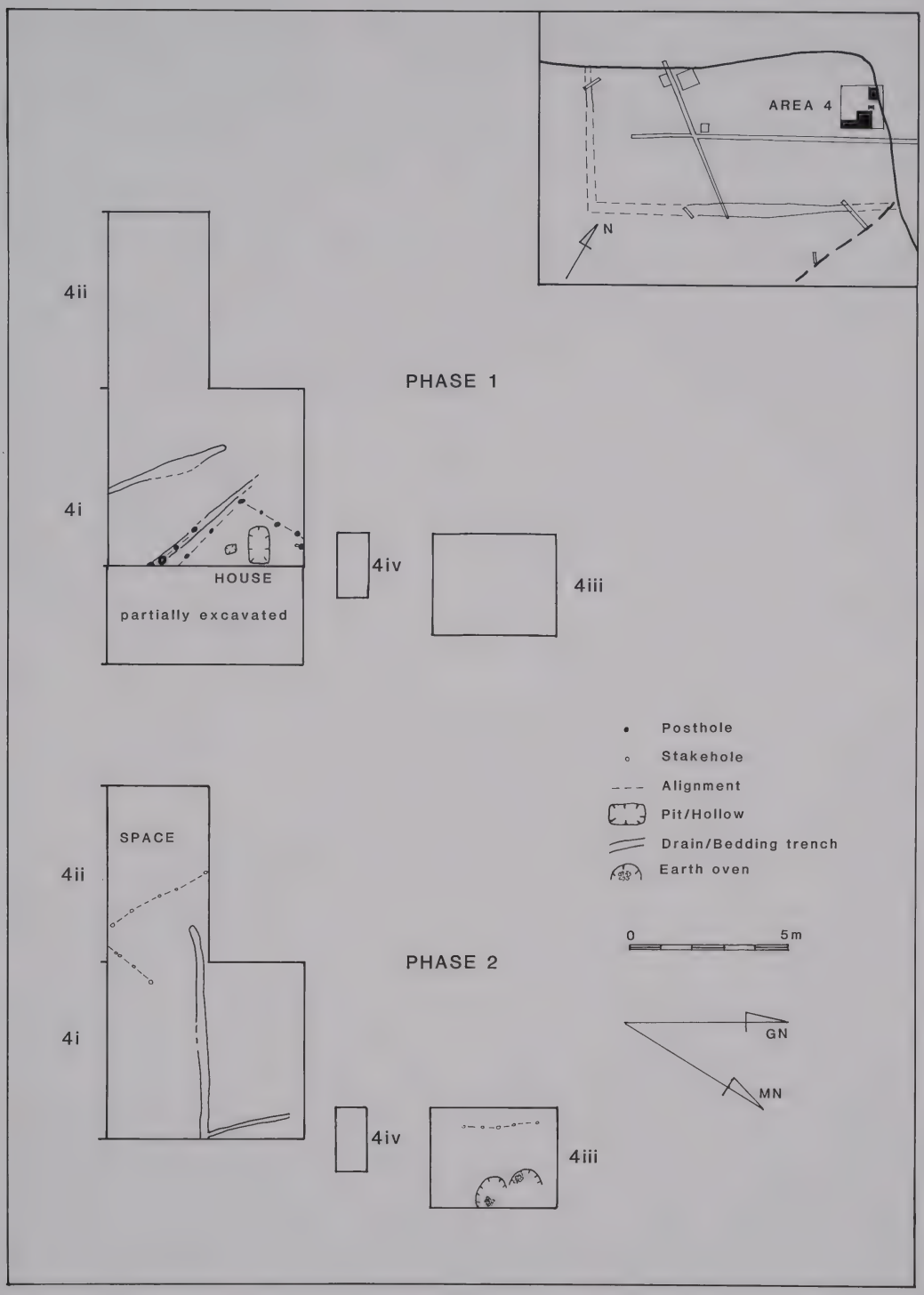


Fig. 2. Early phases of occupation in Area 4. Inset shows location of Area 4.

Phase 4. Overlying these features was a brown sandy soil, up to 180 mm thick, with a somewhat irregular surface (Fig. 3). It was thought to be a living surface derived from Waihou River sediments. The south-west part of this soil contained a shell midden, charcoal, a few fish, bird and dog bones, as well as three obsidian flakes. There was a thin lens of charcoal to the north. The layer thinned out in the east and was replaced by a disturbed clay layer, 50 mm thick.

Several features cut into this layer, including a major drain running from the west. The drain was 100-150 mm wide and 200 mm deep. It sloped at 8° towards the Ohinemuri River, and petered out before the eastern side of the square. Associated with the drain were two alignments of post and stakeholes. Some of the stakeholes in the north-east area may belong to this phase, but this could not be established with certainty because the sandy layer ran out. Another associated feature was a hangi (earth oven) 260 mm in diameter and 130 mm deep filled with stones and shell.

Phase 5. Overlying the soil was a later midden, 100-200 mm thick, comprising dark brown soil with shell, charcoal, a few fish and dog bones, and a few artefacts (Fig. 3). The artefacts included eight obsidian flakes (mainly on the northern side of the square), one chert flake, a piece of worked pumice (thought to be a fishing float), and a net weight.

Phase 6. At the north-east corner, a thin lens of black soil overlay the midden (Fig. 4), and was associated with a small area of firecracked stones, which may have been a plough disturbed hangi (cooking pit).

Phase 7. The upper surface of Layers 5 and 6 showed signs of topsoil development. This fact, combined with the numerous root holes, especially in the south-east corner, and a red ashy burnt patch with degraded wood, suggests a vegetation cover had developed after the settlement had been abandoned (Fig. 4).

Phase 8. Three rectangular patches of disturbed basal clay, two well-formed (2.5 m long and 0.5 m wide), and one smaller (1.2 x 0.4 m) and less well formed, were found to be more than 500 mm deep. They were cut into the basal clay after settlement had ceased, and on these bases are thought to be graves, probably dating to the Christian era (Fig. 4).

Area 4ii

To the south-west, an area of midden and fire-cracked cooking stones was investigated in order to compare it to the midden previously located in Area 3. This square, originally measuring 3 x 3 m, was excavated by hand, and was later extended to 3 x 5.5 m, joining Area 4i. Altogether Areas 4i and 4ii comprised almost 50 m^2.

Phases 2-3. As in Area 4i, the area had been scraped down to the base clay. One of the first features appeared to be a drain which began at the eastern edge of the square and connected with that found in Area 4i (Fig. 2). A line of five stakeholes ran north-west south-east across the square, possibly defining a boundary. The postholes and stakeholes in the west were of different appearance to those in the east of the square. The vacant space in between, may possibly have been a gap between two structures.

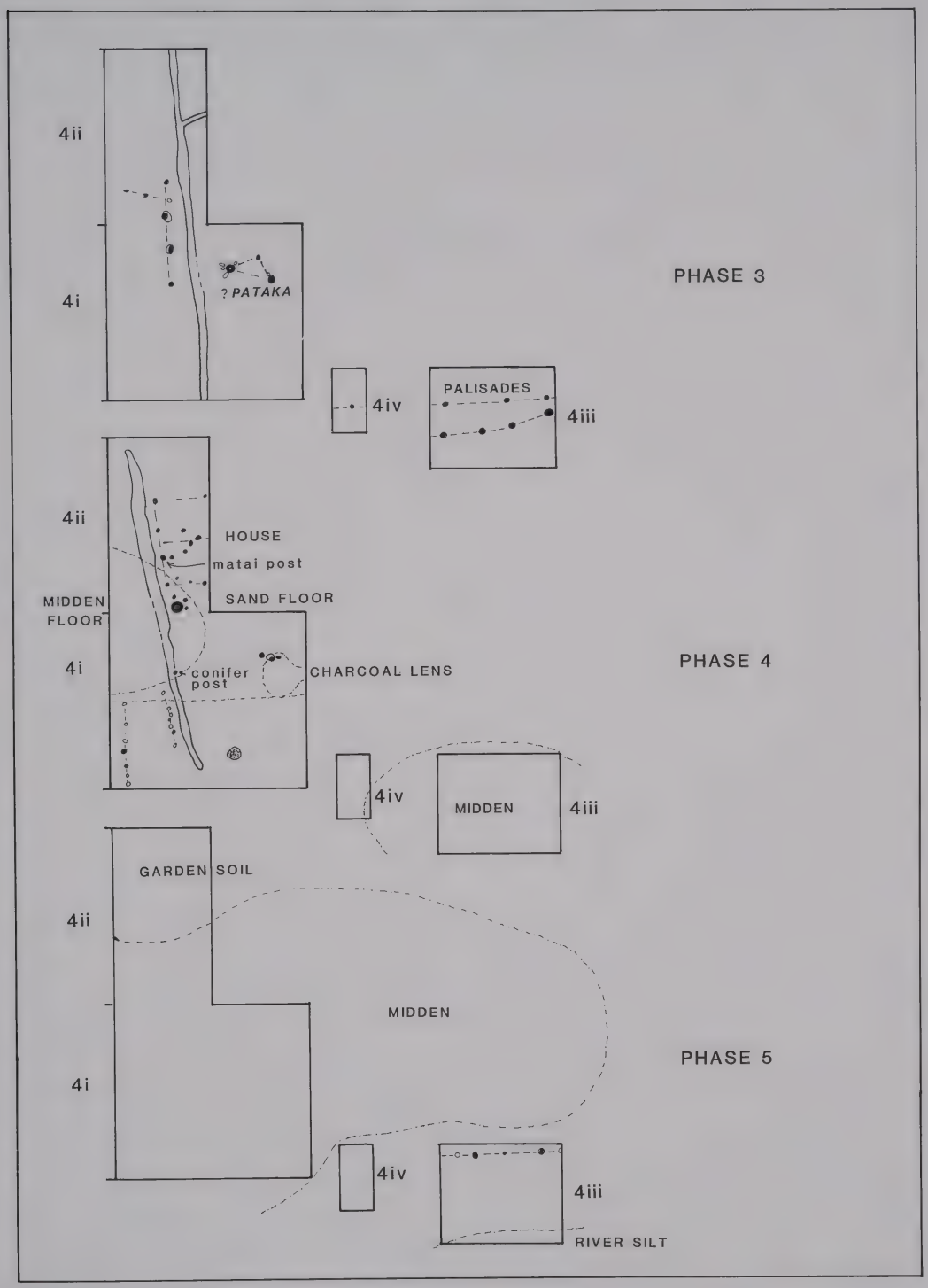


Fig. 3. Middle phases of occupation in Area 4. See Fig. 2 for key.

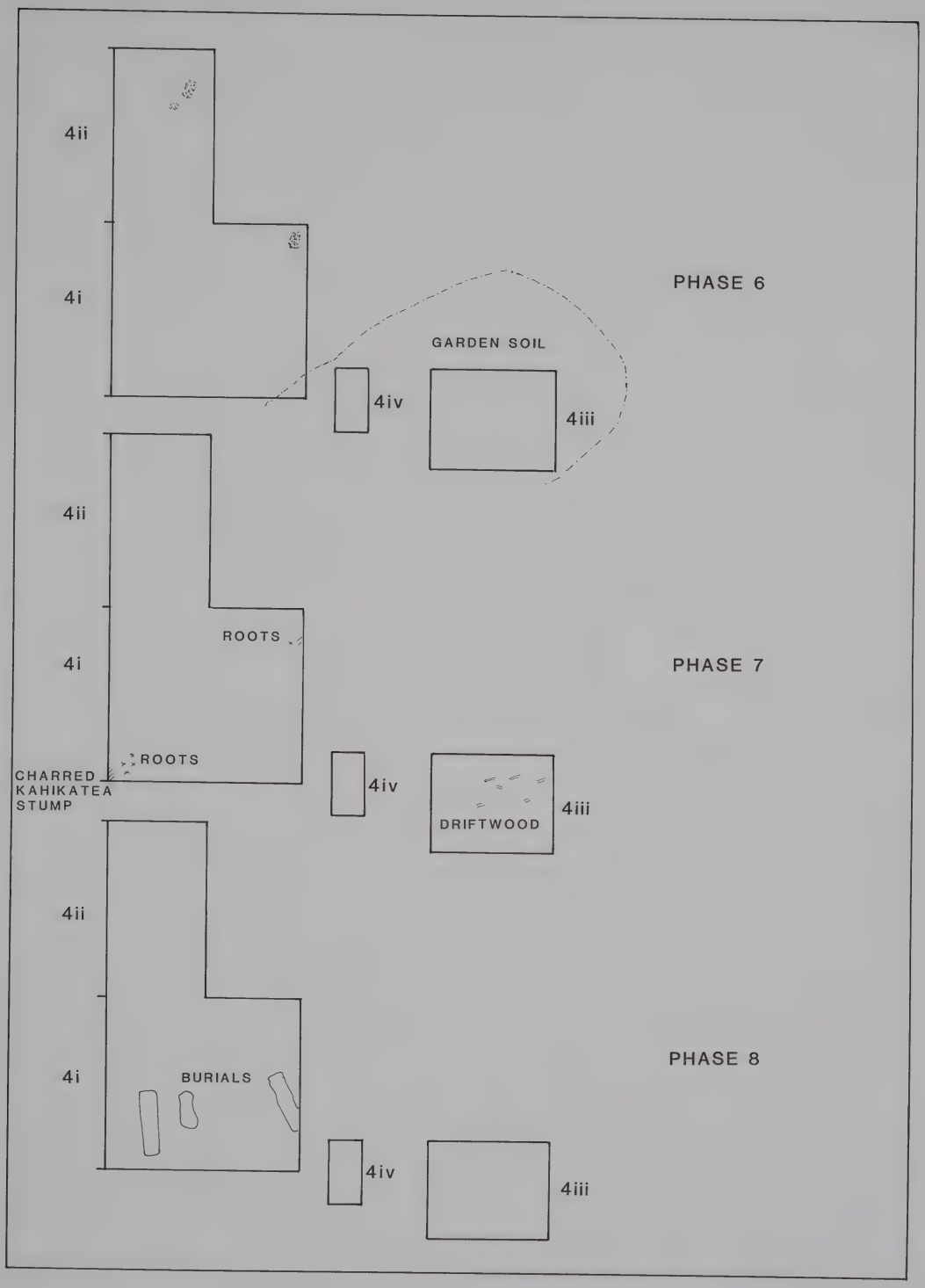


Fig. 4. Final phases of occupation in Area 4. See Fig. 2 for key.

Later the drain had been deepened and extensions added to drain areas to the west and north (Fig. 3). Two short posthole alignments appeared to represent structures associated with the drains. One of these alignments ran parallel to the drains and continued in Area 4i.

Phase 4. Overlying the first two layers a brown sand floor 100 mm thick had been laid down. In it were ten chert flakes and nine obsidian flakes located mainly in the south and west of the square. Associated with this layer was an unconcentrated midden comprising shell and fragments of fish, bird and mammal bone. The mammal bone was probably all derived from dog, though it may have incorporated some pig, and the majority of it was found in the fill of the earlier drains. Again a drain had been cut in the fill, although this was further to the south than before. It began on the west side of the square and ran east, joining up with the later drain in Area 4i. All the postholes of this phase were cut into the area north of the drain and several alignments could be determined. These could be interpreted as a house 2.6 m wide, extending north into the unexcavated area (Fig. 3).

Phase 5. Along the west side of Area 4ii was a mixed dark-brown soil 100 mm thick, which sloped at 1.5° to the west (Fig. 3). The soil contained an even mix of the underlying sand, with organic material, clay and charcoal. It has been interpreted as a garden soil. To the east there was a dark brown midden deposit 100-150 mm thick containing charcoal, fire-cracked stones, fish, dog and bird bone, and shell. There were 21 obsidian flakes mainly in the south-west of the area, and five chert flakes mainly in the south. The junction between these two layers was indistinct, so they have been assumed to be contemporary.

Phase 6. The last features in Area 4ii appeared to be a 100 mm deep hangi, measuring 500 x 700 mm (Fig. 4). It was filled with cooking stones, but there was no sign of charcoal or burning associated with the pit, indicating that the stones had been heated elsewhere. There was one other concentration of stones, but this appeared to have been disturbed by the ploughing.

Phase 7. Some time elapsed after Phase 5 and before the ploughing, since both the midden and the soil had a thinly developed topsoil.

Area 4iii

To the north-east an area 4 x 3 m was opened up to investigate the edge of the site where it sloped into the Ohinemuri River and to see if there was any evidence for palisade type defences. In this area too, the underlying base clay had been exposed by removal of the topsoil. At the western edge the clay was level but it sloped down steeply to the Ohinemuri River in the east.

Phase 2. The earliest features had been cut into the clay. They included two hangi cut into the river bank, incorporating fire-cracked stones, charcoal, fish and mammal bone, and clay flecks, as well as a line of at least five stakeholes along the top of the bank (Fig. 2).

Phase 3. Subsequently a double line of postholes had been cut into the top of the bank (Fig. 3). These probable palisade posts slanted outwards towards the river at an angle of 12-19° from the vertical. The two lines were 250-750 mm apart. The lower postholes were 600 mm deep whereas the upper ones were 300 mm deep.

Phase 4. Overlying the palisade postholes was a midden, containing a black charcoal-rich soil, shell, fish, dog and bird bone, also four flakes of obsidian and some fire-cracked stones. This material also comprised the fill of most of the postholes. The layer had been deposited mainly down the bank and was up to 200 mm deep, covering an area estimated to be 9 x 7 m.

Phase 5. Overlapping the midden was a wedge of brown-grey gritty silt interpreted as material which had been washed by the Ohinemuri River up on to the lower, eastern side. This layer, which reached up to 300 mm deep, contained no cultural material. However, on the top of the bank was a line of post and stakeholes (Fig. 3).

Phase 6. Above the midden was a black soil, 100-200 mm deep. This contained scattered fire-cracked stones, a few shells, fish bones and clay flecks, also five obsidian flakes and two chert flakes on the western side. The extent of the soil was approximately 12 x 6 m, extending right across Area 4iii and part way down the river bank, sloping at approximately 8°. The soil appeared to be well mixed and its limited extent suggested that it had been deliberately deposited over the area, and then used as a garden. This layer petered out in the north-east corner of Area 4i.

Phase 7. Layer 6 contained quite a bit of driftwood and the upper surface had a partly developed topsoil (Fig. 4). Again this suggests that the entire site was abandoned before the deposition of rock flour silt.

Area 4iv

An area 2 x 1 m was excavated in between Areas 4i and 4iii in order to correlate the stratigraphy.

Phase 3. The earliest features were cut into the clay, and included one palisade posthole which slanted at 10° (Fig. 3).

Phase 4. A corner of the midden located in Area 4iii continued in this excavation area. However, it was not associated with either midden in Area 4i (Fig. 3).

Phase 6. The black mixed soil found throughout Area 4iii was here found to be an average of 150 mm thick (Fig. 4).

Phase 7. A period of abandonment was again indicated by soil development on the top of Phase 6.

Phase 8. White clay lumps, probably associated with the excavation of the presumed graves in Area 4i, occurred on the top of the gardened soil, but beneath the rock flour. This would securely place the digging of these features between these two events.

TRENCH B

Trench B had been originally excavated in 1983 by Simon Best (Phillips 1986:94) to determine whether there were any cultural features in what appeared to be simply a grassed paddock. On finding subsurface evidence, the south face of the trench had been drawn rather quickly. In 1988 it was decided to scrape down the north face adjacent to the Area 4 excavations, and where the site sloped down into the Ohinemuri River, to clarify the stratigraphy (Fig. 5).

The basal clay was overlain by a dark soil, some of which contained a shell midden. This occupation layer was relatively horizontal, except at the eastern end where it dipped towards the Ohinemuri River and showed evidence of being scoured by the river. The occupation layer was overlain in turn by several layers of rock flour (the tailings from gold mining which were dumped into the Ohinemuri River). The lowest rock flour deposit was strongly banded, whereas the second and third deposits were composed of homogeneous yellow silt, separated by soil formation. At the west end of the section there was evidence of ploughing which had disturbed both the second rock flour and the cultural deposits. The ploughed zone was overlain by the third rock flour deposit which also had soil development on its surface. Finally, at the top of the section was a thin band of rock flour overlain by the current topsoil. The dating of the layers is discussed later.

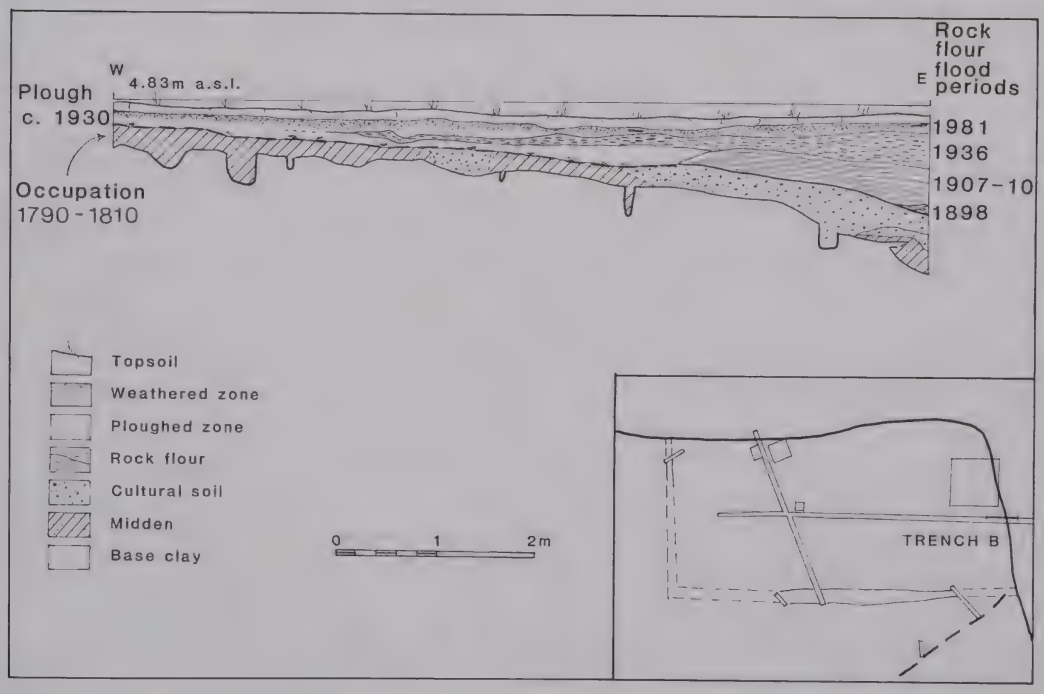


Fig. 5. Section of the north face of Trench B, adjacent to Area 4. Dates are from documentary sources referred to in text. Inset shows location of section.

PERIMETER TRENCHES

Several short trenches were excavated to examine the defences, the river edge, and the inland edge of the site outside the defences. These trenches were excavated by machine and scraped down by hand.

Trench H

This 7 m long trench (Fig. 1) was excavated where it was thought the defensive ditch might return at a right angle towards the Waihou River. The position was suggested by brief testing carried out in 1987 and by an old land map (D.O.S.L.I. 1903b) which showed a line thought to indicate a ditch.

The stratigraphy (Fig. 6) showed that the whole area had been occupied. A charcoal-rich black soil overlay the base clay. On the west side of the section this included a shell scatter. The defensive ditch cut through this layer down into the clay, to a depth of 1.6 m. The ditch here was V-shaped, being approximately 2 m wide at the top, and coming to a point at the base. The material dug out was heaped up inside the site in a rough bank, 2 m wide and 0.4 m high. The base of the ditch was filled with a 400 mm thick sandy sediment from the nearby Waihou River, and the ditch may have been deepened by the river washing up it. Subsequently, the bank had collapsed into the ditch, resulting in a mixed fill of clay and silt, including some debris washed in from the site, such as charcoal and fire-cracked stones. It appeared that one segment of the bank has been pushed into the ditch late in the sequence, possibly when the site was ploughed. Flood material had then washed over the top with the result that the ditch was not visible at all on the modern land surface.

Trench J

The trenches opened up in 1988 indicated that the defensive ditches were much deeper than originally thought. Therefore, a face 4.5 m long adjacent to the battered face excavated in 1987 was dug by machine to test this (Fig. 1). It should be noted that in 1984 the water table was very high, making any deep excavation impossible; in 1987 the soils were extremely dry, making hand excavation very hard and distinction between the base clay and clay fill difficult. Thus only in 1988, through a combination of moist soils and machine digging, was a proper recognition of the precise outline of the ditch in this part of the site finally achieved (Fig. 6).

The base of the ditch had been filled with clay which was slightly stained with charcoal, and was 500 mm deeper at this point than originally thought. The ditch was quite different in shape to that found in Trench H, being 3 m wide, 1. 5 m deep and rectangular in profile with a flattish bottom. No evidence of a bank was found in this trench.

Trench G

This 13 m long trench was excavated to investigate the low-lying ground to the south of the site (Fig. 1), which had been an old course of the Ohinemuri River, and to see how far the defensive ditch extended towards the present Ohinemuri River.

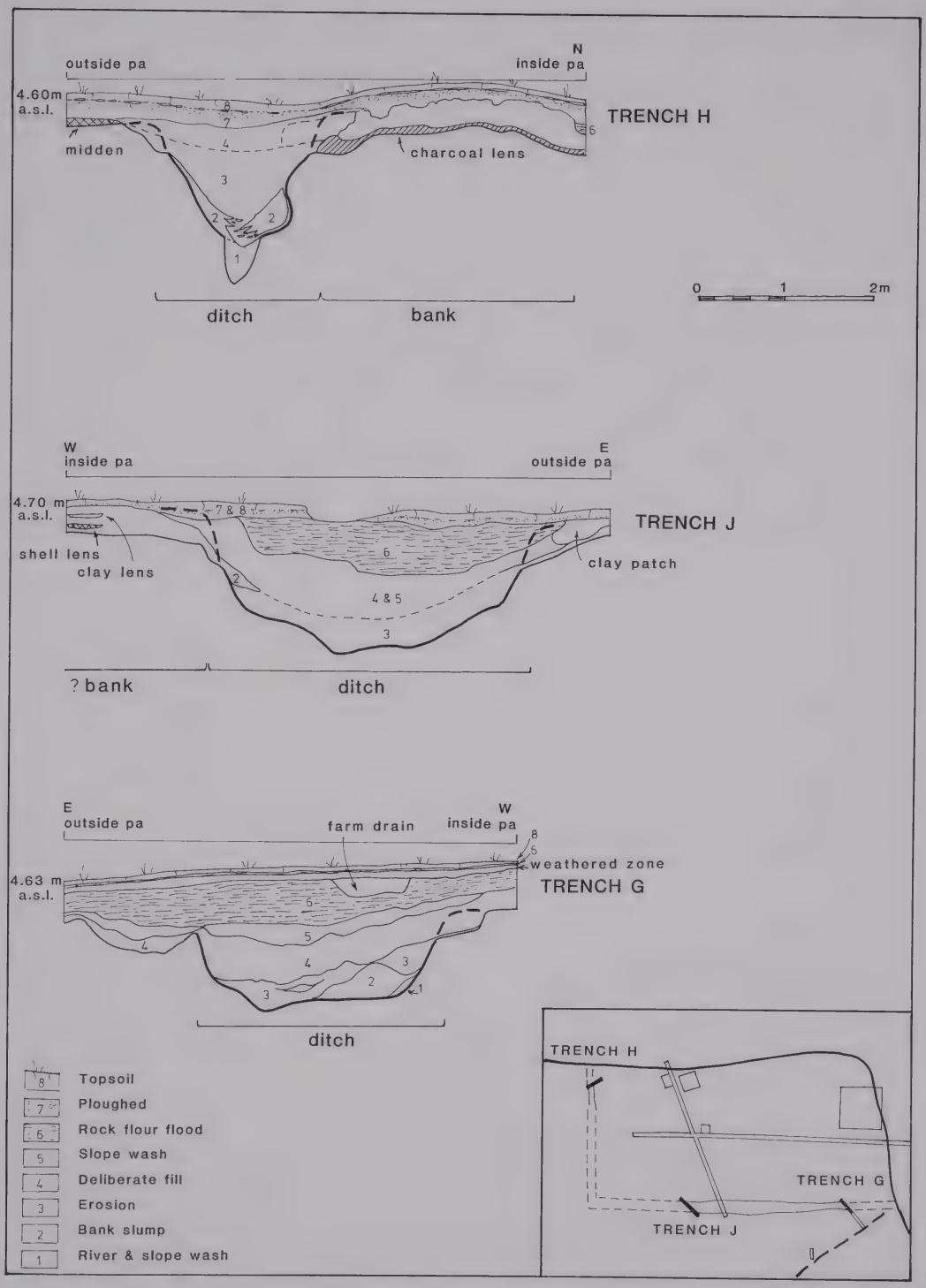


Fig. 6. Section of Trenches H. J and G, showing the ditch and bank defences. The sections have been corrected for the distortion of width caused by the angle of the trenches. Inset shows location of the trenches.

Here the ditch was 2.2 m wide and 0.8 m deep (Fig. 6). There was no sign of a bank. Neither was there any sign of cultural material or occupation adjacent to the ditch. However, blocks of charcoal-rich soil and occasional fire-cracked stones were found in the fill of the ditch, and blocks of its clay walls plus a grey silty clay lay in its base. The latter could have been washed in by the Ohinemuri River.

Immediately to the south of the ditch, and thus outside the defences, were a depression, a posthole and a scoop. These features and the ditch were filled with a black crumbly soil mixed with clay, on top of which was another black soil layer. These layers were overlain by the rock flour. Again there was no sign of the ditch on the surface.

In the southern part of the trench, the base clay dipped into what had been the Ohinemuri channel. This had been filled with a silty sediment, distinctively different from that found in the Waihou but typical of the Ohinemuri River. Overlying the parent clay on the site itself and the river silt was a 200 mm thick crumbly dark brown soil with charcoal flecks. It sloped down to the old river bed at angle of between 5° and 15°, and was interpreted as a possible garden soil. At the southern end there was a band of oxidised iron which suggests that this was permenently wet at some time, presumably after water tables had been affected by flooding. This band was in turn overlain by the rock flour.

Trench I

The position of the defences of the pa, thought to have been indicated by lines on an early survey map (D.O.S.L.I. 1903b), were confirmed by excavation of Trenches G, H, and J. The survey map had also shown a barbed-wire fence boundary, and it was thought that the ploughing might have been restricted to the area contained within the fence. Trench I, therefore, was placed outside both the known area of ploughed soils and the pa defences (Fig. 1). It was hoped that a relatively undisturbed area might reveal either the type of occupation outside the pa boundaries, or the natural soil profiles.

In the northern half of the section a posthole and a small scoop had been cut into the base clay. Both these features were filled with and covered by a dark brown soil containing charcoal fragments. To the south a grey clay graded into the base clay, and may represent an unmodified subsoil. These soils were overlain by the rock flour. Ploughing had taken place in this area, but it was generally shallow and only disturbed the rock flour.

DISCUSSION

SITE ENVIRONMENT

Reconstruction of the environmental setting provides an understanding of the resources available to the inhabitants of the site. Organic remains recovered during the investigations indicate which plant resources were actually being used. Archaeological and documentary evidence can be used to reconstruct the environmental history of the site after occupation ceased.

The natural environment

There are four major environmental zones within a 4 km radius of the site (Fig. 7). These are the peat swamp, the uplands, the kahikatea swamp, and the Ohinemuri and Waihou Rivers. The natural river levees on which the site is located are a restricted sub-zone of the kahikatea swamp.

Peat swamp. The centre of the Hauraki Plains is a dome of waterlogged peat. The Waihou River enters the margins of the peat swamp 10 km upstream from the site. This zone could have been the source of many animal and plant resources, such as waterfowl and eel, flax and raupo.

Upland. The soils of the Kaimai Ranges and Matamata hills are well drained loams and earths. Generally, the uplands support broadleaf/podocarp forest. This zone would have provided timber, often in the form of driftwood. The nearby Kaimai Ranges would also have provided a ready source of cooking stone.

Kahikatea swamp. This is a zone of low-lying gley soils on the margin of the Hauraki Plains. The vegetation is mainly kahikatea forest. This zone is a relatively impoverished one, both for culturally useful products and for occupation.

River levees. The raised levees caused by river flooding and meanders are generally better drained than the kahikatea or peat swamps. This would be more true of the sandy deposits of the Waihou River, than the river silts deposited by the Ohinemuri River. Raupa is a good example of this, since there the underlying clays have been scoured by a meander of the Waihou, leaving a deposit of Waihou sandy loam up to 2 m thick; whereas Waiwhau lies on the Ohinemuri derived Waikino silty clay soils. It is interesting that this area is dominated by river meanders, so that levees back on to themselves, forming large areas of raised ground, drier than the surrounding environment. This is especially true at the junction of these two major rivers (note also the levees at the downstream junction of the Waihou and Hikutaia Rivers). It seems likely that these areas were specially selected for occupation and cultivation.

Rivers. The Ohinemuri rises near Waihi in the Kaimai Ranges, while the Waihou originates in the hills above Matamata. Waiwhau is located at the junction of these two major rivers which then flow north to the Firth of Thames, 35 km downstream. This zone provided drinking water and fresh water fish, including the economically important eel. The rivers comprised a transport route to all the other zones.

Exploitation of plant resources

Pieces of charcoal, wood and fruit stones were found mainly within the midden layers, Phases 4-6 (Appendix 1). These presumably represent remnants from fires as well as the remains of structures and food debris. There were at least 21 different species. Most were forest trees such as matai (*Prumnopitys taxifolia*) and tawa (*Beilschmiedia tawa*), as well as smaller trees such as ramarama (*Lophomyrtus bullata*) and manuka (*Leptospermum scoparium*). Hebe and coprosma also occur. The fact that the charcoal was derived mainly from trees, with only a few twigs,

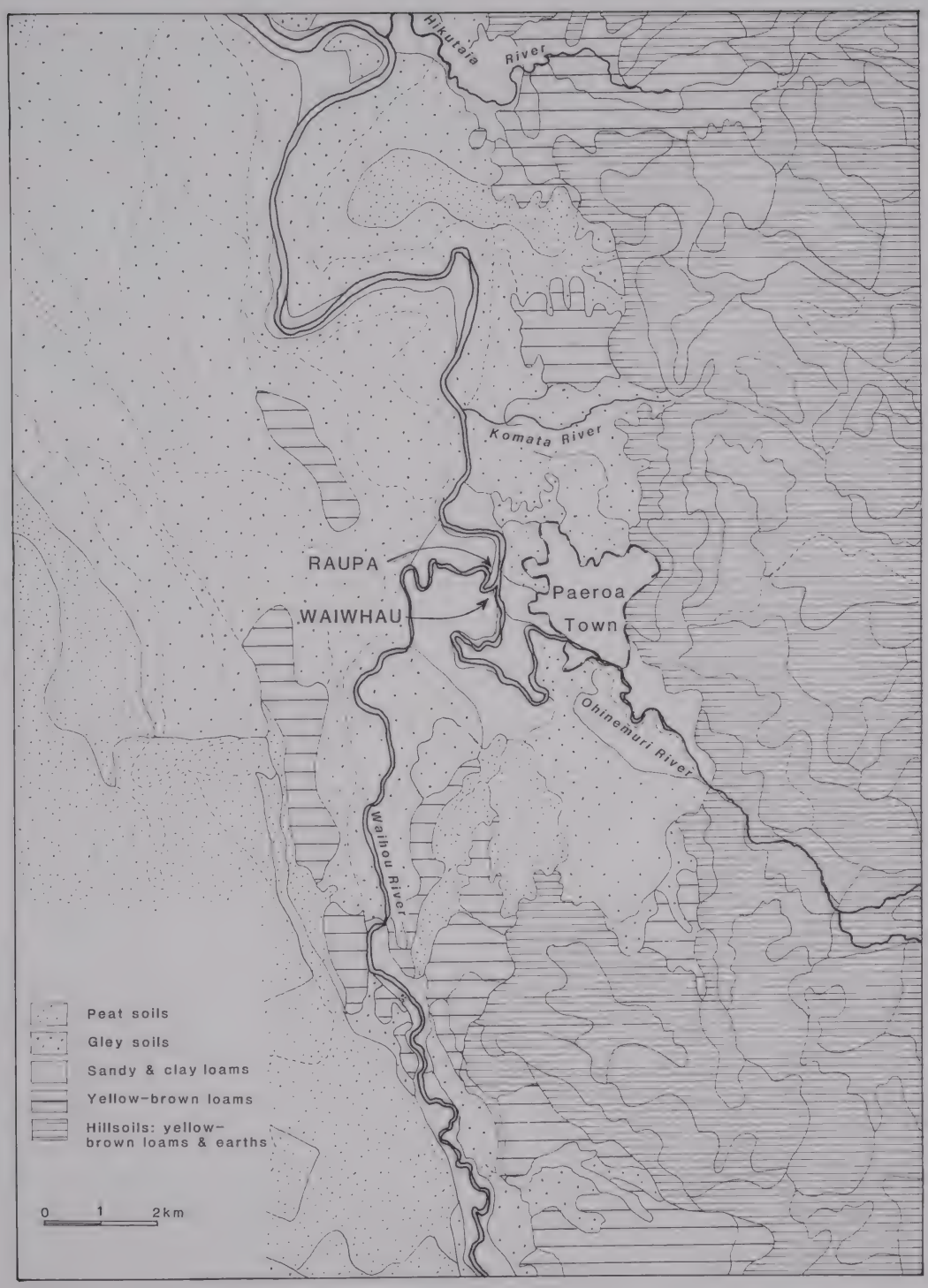


Fig. 7. Map of soil distribution in the region of Waiwhau. Based on Trustrum and Crippen 1986.

suggests that firewood was not in the main collected from the local environment but was largely driftwood. Both rivers at present contain much driftwood which in times of flood is deposited on the site. It appears from the amount of wood found beneath the rock flour in Area 4iii, that this also occurred before the major flood episodes of the late 19th and early 20th century. Thus driftwood could have been a major source of firewood for the occupants. Fruit stones from karaka (*Corynocarpus laevigatus*), tawa/taraire (*B. tawa/tarairi*), and hinau (*Elaeocarpus dentatus*) may represent trees planted on site or food brought to the site. Two wood samples came from posts. These were matai and a very degraded specimen which could only be identified as a conifer.

The previous excavations recorded similar findings. These included the remains of totara (*Podocarpus totara*) and matai posts, tawa/taraire fruit stones, and charcoal from fires. The species used for firewood were largely the same as those used in Area 4, with the addition of beech (*Nothofagus* sp.). The finding of beech at this altitude supports the idea that driftwood was a source of timber (Phillips 1988:62).

Post-occupational changes

A kahikatea root that had intruded on the occupation was partly burnt before the rock flour deposit. This suggests some regeneration of vegetation after the abandonment of the site. Old land maps (D.O.S.L.I. 1884a and b) show that by that date kahikatea had been cleared well back from the rivers, especially in the vicinity of Waiwhau. The banks at that time were covered in patches of high manuka and low scrub (Fig. 8).

The occupation is sealed by layers of rock flour, the result of tailings from gold mining being dumped in the upper reaches of the Ohinemuri River from 1895. These tailings which blocked the waterways, along with forest clearance of the hills, resulted in massive flooding of the low-lying regions of the Hauraki Plains. Major floods occurred in 1898, 1907, 1910, 1936 and 1981 (Barber 1985). Four distinct layers of rock flour are evident on the site. The lowest is a banded orange-yellow layer, followed by at least two homogeneous yellow layers divided by soil formation (Fig. 5). Some soil formation is also evident on top of this layer. The uppermost layer is a thin band immediately below the topsoil. These layers can be equated with the recorded flood epsiodes.

An old land map of 1903 (D.O.S.L.I. 1903b) suggests that manuka, cabbage trees (*Cordyline australis*) and briars (?*Rosa* sp.) were present (Fig. 8). By this time the "Native Burial Ground" of Waiwhau had been fenced off.

The site and adjoining land of Waiwhau North was partitioned from the land blocks Waiwhau Middle and Waiwhau South in 1933. It is possible that at this time the site was ploughed to bring it into grass production. Certainly, there is evidence of ploughing after the first two episodes of flood debris and before the upper two, which would place it sometime between 1910-36. Traces of tracks were found at this level in Area 4i which could have been made by the vehicle that pulled the plough. These consisted of a series of linear indentations measuring 280 mm wide, 160 mm apart, consistent with the treads of a steel wheeled or tracklaying tractor. In the higher areas of Waiwhau ploughing disturbed the occupation layer.

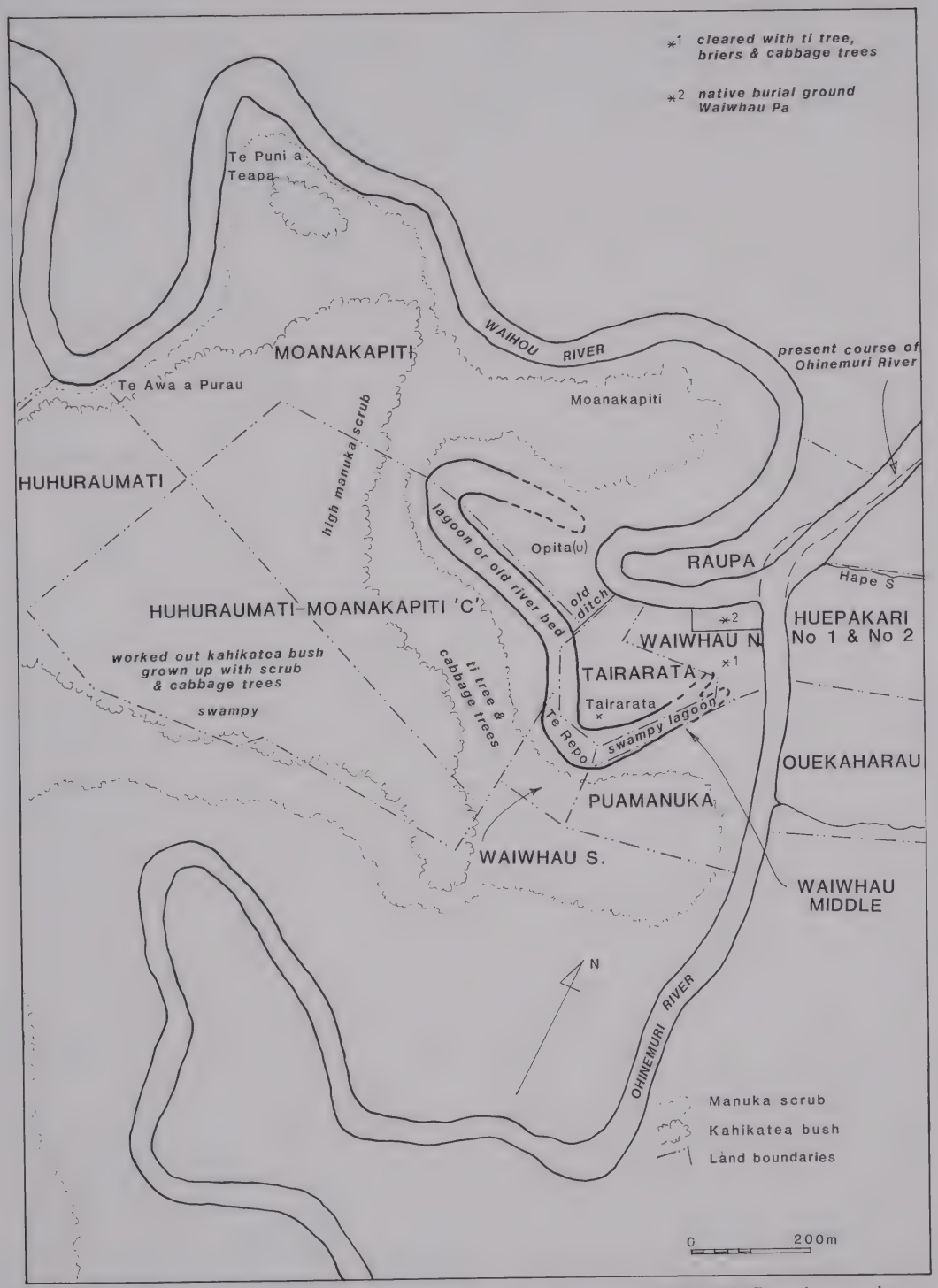


Fig. 8. Vegetation, land blocks boundaries and river courses 1887-1903. Based on early plans of land blocks (D.O.S.L.I. 1878a and b, 1879, 1880, 1884a and b, 1887, 1890, 1903a and b).

Attempts to protect farmland from flooding began in 1910. Stopbank construction began in 1913 and the Waihou River was re-channelled to the west, leaving a shallow pond where the channel had been. Even after extensive stopbanking, river re-channelling and floodgate construction, the worst flood on record occurred in 1981. Further stopbank and berm construction began in 1983. This destroyed a small portion of the south-west corner of Waiwhau, exposing cultural deposits in the cut bank.

SETTLEMENT FEATURES AND ACTIVITIES

Indications of different types of settlement activities, such as gardening, housing, cooking, storage, defence, manufacture and burial, can be identified in the occupation sequence. Evidence of these activities was found over the entire area examined. Some activities were concentrated, and in some places the activities had changed over time. Each of these activities is discussed separately below.

Gardening

Soils were observed in various parts of the excavation which had several characteristics in common, including stratigraphic position, depth, compositional inclusions, slope and area. They have been interpreted as garden soils (Fig. 9).

The soils overlay the base clay or other cultural layers very distinctly, which suggests deliberate placement. They were often up to 200 mm deep. Another feature was the mixing of occasional cultural material (shell, charcoal, fire-cracked stones), with some subsoil and base clay. In all recorded instances these soils were on a slight slope ranging from 2-15^0, and they were observed mainly on the edge of the site. Their extent was only measured in Area 4iii, where it was approximately 60 m^2.

Jan Coates (pers. comm.) has suggested, on the basis of these observations, that on a clay base gardens might be placed on sloping ground to provide drainage. It is possible that a series of small gardens were placed around the edge of the site where there was a natural slope down to the river's edge, or at other places draining down to lower ground. Soil suitable for gardening would have been brought from other parts of the site to these better locations. A possible example can be seen in Trench G, where no subsoil or topsoil is present at the northern end. In fact, several features have been truncated, and there is a thick layer of soil to the south. Such gardening probably took place throughout the sequence, although the soils so far identified belonged to the post-defensive period.

It is generally assumed that kumara was the crop grown on Maori sites, yet potatoes, turnips, cabbage and maize had been incorporated into Maori gardens early in the nineteenth century in many areas (Leach 1984). In 1801 a group of missionaries who visited the Thames district and sailed up the Waihou River two miles (3.2km) upstream from the Hikutaia River junction recorded that European potatoes and turnips were being grown (Anon. 1801). In June and July 1820, Marsden travelled up the Waihou River and stopped at a village one hour's walk downstream from Raupa where he was presented ". . . with plenty of fine potatoes . . ." (Elder 1932:263). It is likely that potatoes that were grown on the ill-draining Waikino silty clay soils at Waiwhau, since kumara required good drainage.

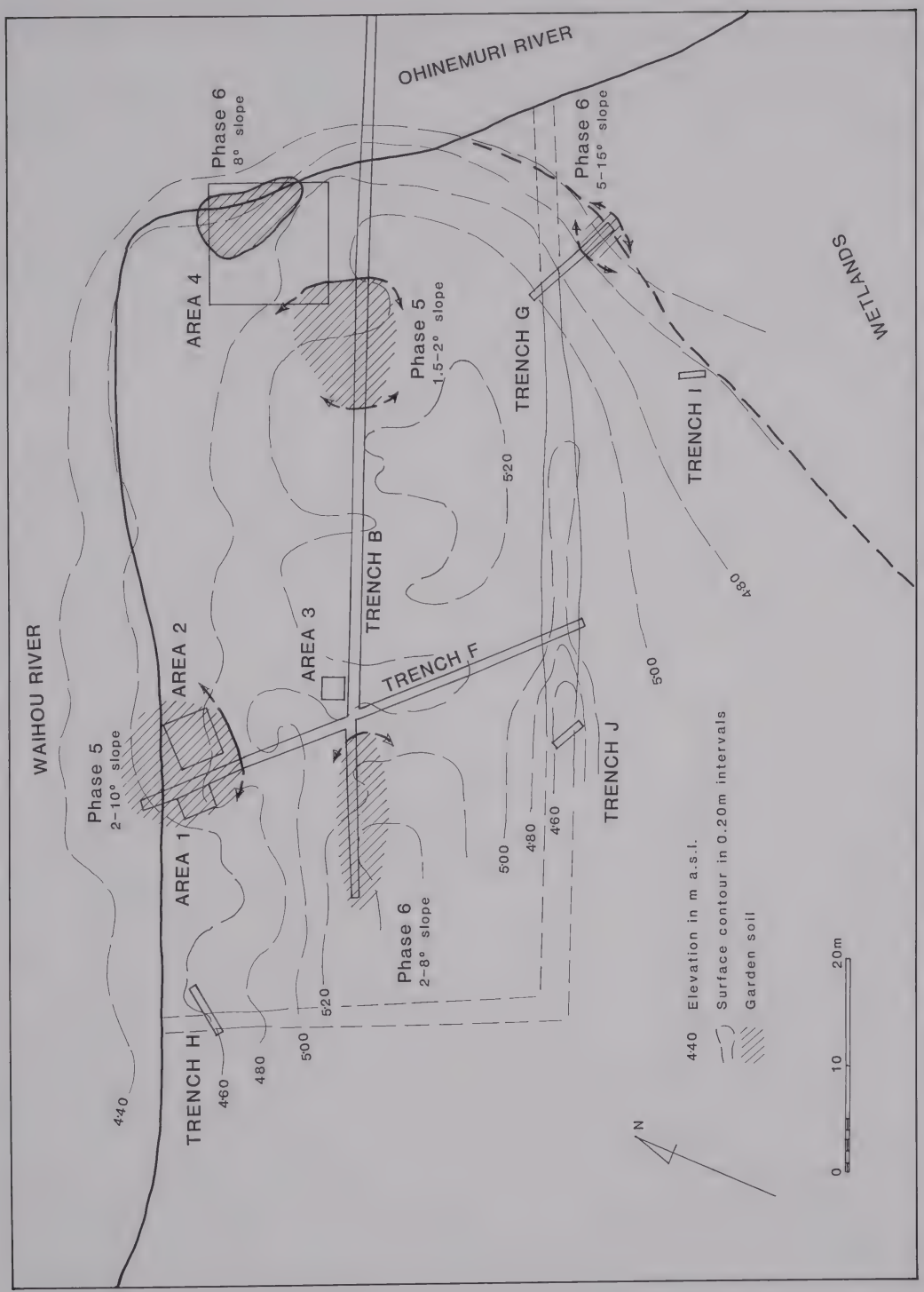


Fig. 9. Map showing contours of modern land surface of Waiwhau site and areas of possible garden soils.

Housing

The previous excavation of Areas 1 and 2 uncovered several posthole alignments, some of them set in bedding trenches, on a levelled area of ground. This was interpreted as a house 7.5 m long and 3.5 m wide with a double line of central postholes (Phillips 1988:60, Fig. 6). Excavation Areas 4i and 4ii uncovered many postholes and some possible bedding trenches, which can be interpreted as two possible houses, one approximately 4.8 m wide (Fig. 2) and the second 2.6 m wide (Fig. 3). These structures were not fully excavated so the lengths could not be determined. The widths of these three examples suggest small living houses, or possibly temporary dwellings (Prickett 1982).

Cooking — food refuse

Three distinct patches of shell-rich debris were located. The middens at the south of Area 4i/ii and at the north-east of Area 4iii belonged to Phase 4, while a later midden overlying most of Area 4 was deposited during Phase 5 (Fig. 3). The areal extent of these middens was from approximately 35 to over 250 m^2.

Five midden samples were collected. The samples were wet sieved with a 2 mm sieve and stones, charcoal and soil were removed. Further sieving into pieces greater than 4 mm, between 4-2 mm and less than 2 mm was done to give an indication of the amount of crushing that had taken place. The only faunal material in the samples was marine shell. This was identified and weighed (Appendix 2). The shell from both the early and late midden samples was almost identical, in that it consisted mainly (89%) of pipi (*Paphies australis*) with 10% cockle (*Chione stutchburyi*). The remaining 1% comprised individual specimens of whelk (*Cominella* sp.), trough shell (*Mactra ovata*) and an unidentified gastropod. Both the early and late middens were crushed to the same extent. The proportions of shellfish species in these middens is remarkably similar to the Area 3 midden excavated in 1987 which showed 85% pipi and 8% cockle and a few other estuarine and tidal flat species (Barr & Eaves n.d.).

Hand excavation revealed various bones, as well as fruit stones within the occupation layers. These were removed and identified separately.

Bird, fish, dog and possibly pig bones were recovered (Appendix 3). Most was fragmentary and the assemblages were very small, therefore no attempt was made to ascertain the minimum numbers of individuals. None of the bird bones were identified. Amongst the fish only three bones belonging to snapper (*Chrysophrys auratus*) and an elasmobranch were identified. It is notable that in an area famous for eel fishing that no eel bones were recorded. Several dog bones, some unidentifiable mammal bones and a possible pig bone were recovered, the majority of which came from Phase 4 in the occupation. Despite the uncertainty of the identification of pig bone in this area of the site (see note Appendix 3), pig bone has previously been collected from the midden in Area 3 from a context late in the occupation of the site (Phillips 1988:63).

The fruit stones are the only vegetable remains recovered. They included karaka, hinau and tawa or taraire (Appendix 1). It was noticable that all were extensively charred and that only the karaka stone was intact, the rest being in halves.

Although shellfish, birds and fish are very likely to have been indigenous and dogs were a pre-European introduction, pigs are obviously a more recent addition to the Maori diet and can therefore be used as an indicator of the date of the occupation. The missionaries who travelled up the Waihou River to 12 km from Waiwhau in 1801 reported that ". . . no quadrupeds of any kind are to be found except dogs and rats and these are not very numerous" (Anon. 1801:29). Pigs, however, must have been introduced not long after this period, as they appeared to be fairly common by the second decade of the nineteenth century. In January 1815, Marsden visited the west coast of the Firth of Thames and recorded ". . . some very fat hogs . . ." (Elder 1932:106). Later, in June and July 1820, he travelled up the Waihou River, stayed at Raupa and following the Ohinemuri crossed over the Kaimai Range to Tauranga. When he stopped at a village one hour's walk downstream from Raupa he was presented with ". . . a good hog" (Elder 1932:263), and at Tauranga he states ". . . they had plenty of potatoes and also pork" (Elder 1932:268).

Cooking — earth ovens

Other evidence of cooking was the presence of hangi. These were in the form of small circular pits filled with fire-cracked stones. Generally they did not include much charcoal. In Area 4 these pits were 250-800 mm in diameter and up to 200 mm deep.

Six pits had previously been found in Area 1 and Area 2. Three were accompanied by a large amount of charcoal but with little stone and tended to be larger (1 m in diameter), while the other three were smaller (300 mm in diameter) and included stones. It was suggested that the stones were heated in the large pits and then transported to the smaller pits where the actual cooking took place.

Storage

Few indications of storage occur on the site, the one certain example being a small pit in Area 4 (Fig. 2). There were also several stakehole alignments, some of which could represent racks. In addition, it is tempting to interpret three large postholes as the remains of a pataka (Fig. 3); on a low-lying site above ground storage must have been a priority.

Defence

The site had been made into a pa at some point in its history. Evidence for its defence could be seen in the construction of a ditch on the western and southern sides; and in a surrounding palisade on the eastern and northern sides. The defences enclosed an area 105 x 50 m (5355 m^2).

Excavated sections across the ditch in four places indicated it varied considerably in dimensions and shape. It was from 2-3 m wide and 0.8-1.5 m deep (Fig. 6). In some places there was evidence of a small bank. The base of the ditch varied between 3-3.4 m a.s.l., and part of it would have been flooded in times of high water. Approximately 20-30% of the ditch was filled by natural erosion. A further 50-70% appeared to have been deliberately filled between the first and second or third episodes of rock flour deposition (i.e. between 1898 and either 1907/10 or 1936).

The palisade was represented by a double alignment of sloping postholes. In Area 4 the outer line of postholes was 600 mm deep and the inner line was 300 mm deep. The postholes were associated with Phase 3 of the occupation sequence.

Overall, these findings suggest that the defence at Waiwhau was not formidable, since the palisades cannot have been large and the ditch was not very deep. Thus, Waiwhau provides a contrast to the neighbouring site of Raupa, where the ditches were approximately the same size but the palisades, set in holes 1.7 m deep, were obviously much more impressive. A site of the same period as Waiwhau that might have been similarly defended was seen by the missionaries who sailed up the Firth of Thames on board the 'Royal Admiral' in 1801. They recorded visiting a settlement in the Thames region, "About 20 yards from the water side we saw a fence, or pailing, 5 feet high with an opening in the middle to enter in, within were their huts" (Anon. 1801). The fact that occupation deposits covered the palisade postholes, and the lack of decomposed posts (where other wood did survive on the site), suggests that the palisades were removed, and that the defensive period was not long-lasting. It would be unlikely that a pa would be abandoned leaving the defences intact which could then be used by hostile tribes, especially one so near other centres of occupation. Palisade posts must also have been removed from Raupa, for when Henry Williams visited the pa some 10 years after its abandonment he recorded, "No one here; nor any fences up to indicate a fortress . . ." (Williams 1833).

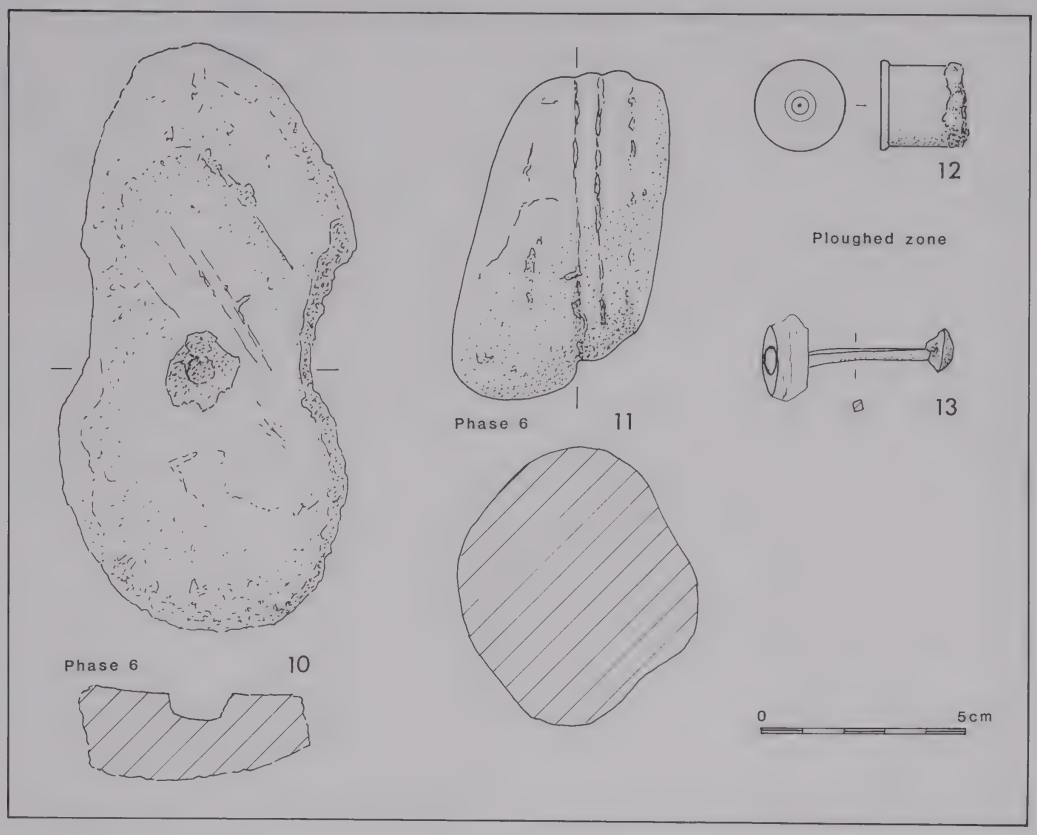
Tool use

The portable artefacts in Area 4 included: 53 flakes of obsidian, 26 flakes of chert, three pieces of greywacke, two pieces of sinter, some red ochre and other assorted fragments. Some of the flakes had signs of use-wear on them and a few appeared to have been used as drills. There were also a pumice fishing float (Fig. 10), a net weight (Fig. 11), a few grinding stones and some greywacke fragments (possibly adze chips). European items included a nail, some rusted iron fragments possibly barbed wire or nails (one was found embedded in a piece of wood, shown in Fig. 13) and a shotgun casing (Fig. 12). As in Areas 1-3, these European items were all found within the upper ploughed layer.

The most common source for the obsidian was Mayor Island (53%), the next most common was the 'grey' obsidian possibly from Whangamata (34%), the remainder being from Waihi, with two fragments identified from the Pungaere source in Northland. The density of the pieces was less than one per square metre. This fact, together with the small size of the flakes suggests that they were waste fragments that had become incorporated into the midden. The other stone material was similar to that sourced previously to the surrounding uplands (Phillips 1988:66-7, 69).

Burial

Three rectangular areas of clay were found within Area 4i (Fig. 4). Owing to their depth and their shape it was assumed that they were Christian burials of at least two adults and possibly one child. These inhumations were made after the habitation at the settlement had ceased, possibly after a period of revegetation on the site (Phase 7).



Figs. 10-13. Artefacts from Waiwhau Area 4. 10. Pumice float. 11. Net weight. 12. Shotgun casing. 13. Nail embedded in fragment of wood.

Several burials had been found in Area 2 in 1987. In contrast to the late burials, these were of very young children (6 months-2 years old) and were deposited in shallow pits in a coiled position. They derived from the earliest level of occupation in Area 2 (Phase 1 or 2).

CHANGES THROUGH TIME

The longest period of occupation at Waiwhau appears to have been in Area 4 where six occupation phases were identified. Elsewhere there were from two to four occupation phases. Because of the ploughing it is not always easy to correlate these phases throughout the site, except where they are associated with the defensive features. Assuming that the ditch and large posts around the site circumference all relate to one episode, then the major phases of pre-defensive, defensive and post-defensive occupation can be described. The later phases of abandonment, farming and flooding can also be identified throughout the site.

Pre-defensive occupation

Only scattered evidence exists for occupation prior to the defenses (Phases 1 and 2). This is in the form of charcoal and shell lenses in Trench H and in the western end of Trench B. In Area 2 there are four child burials. It is most concentrated in Area 4 at the junction of the two rivers, where there are small store pits, possibly a small house, drains, stakehole alignments and hangi. The small amount of evidence from this period suggests that the occupation lasted only a brief time before the defence of the site (Fig. 14).

Defended occupation

Apart from the defensive features of large postholes and the ditch there appears to have been a major working of the soil in Phase 3 although there are few features (Fig. 14). In Areas 1 and 2 a terrace was levelled for the construction of a house. In addition, a hut or store was erected in Area 3, and in Area 4 there are drains and postholes. Other occasional features such as postholes and hangi may relate to this phase.

Post-defensive occupation

The defensive phase seems to have been short-lived. During the three phases that followed the bank collapsed into the ditch, followed by several layers of infilling. The palisade postholes within Area 4 soon became covered with other layers, suggesting the posts had been removed rather than being left to rot away. In Areas 1 and 2 the house appeared to have burnt down and a charcoal lens was deposited (Fig. 14). The charcoal-rich hangi and obsidian working floor could also belong to this phase. The obsidian working occurred earlier in the sequence, if one adheres to the premise that obsidian was quickly replaced by iron tools. However, it may have also had ceremonial uses (e.g., in funeral rites) which continued after the introduction of imported iron for more practical tasks. In the northern section of Trench F there was a floor, garden soil and postholes; while in the central section and in Area 3 there was midden. In Area 4i/ii there was a house, drain, hangi, and stake alignment; followed by a garden and midden; and finally three hangi. In 4iii there was a midden, followed by a garden. In Trench G there was a garden soil. Other patches of soil, charcoal, sand and clay seen in the sections indicate disturbance of the ground.

Abandonment

Evidence of abandonment occurred everywhere in the form of soil formation and the accumulation of driftwood. The 'Christian' style burials in Area 4i belong to this phase (Fig. 14).

Floods

Deposits indicating three main episodes of flooding were seen on the site. The first was marked by coloured bands of rock flour, presumably the floods of 1898. The later material was homogeneous, presumably reworked in the river, and may represent the 1907, 1910 and 1936 flooding periods. The last flood material that can be seen just below the turf represents the recent 1981 flood. This sequence is best seen in the section of Trench B (Fig. 5).

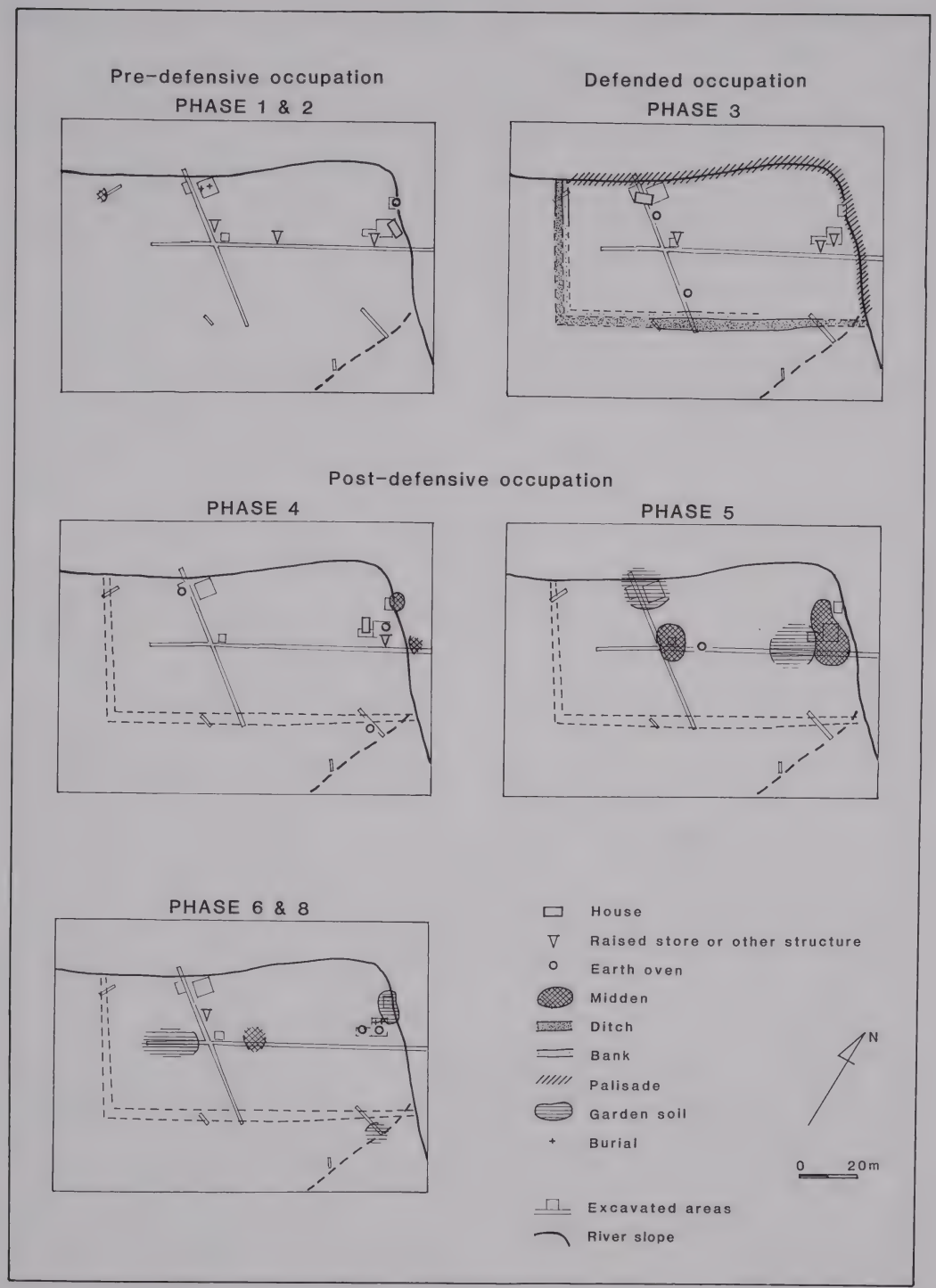


Fig. 14. Changing patterns of settlement at Waiwhau.

Farming

Evidence of farming includes drains, presumably dug to drain lowlying wet areas, barbed wire fragments from old fences, and ploughing which affected most of the site. The drains and ploughing occurred after the earlier floods and probably represented an effort to bring the land into grass. The use of the lands system of ploughing indicates that this episode took place early in the 20th century. Tracks from a steel wheeled, or tracklaying, tractor found in Area 4i between the rock flour deposits (dated 1910 and 1936), probably relate to this event.

ASSOCIATION OF FEATURES

In the previous discussion various features have been associated with certain activities, e.g. posthole alignments were equated with housing. These associations will be tested by looking at how often the features co-relate. An extension of this test will be to see how often different activities are grouped on the site. At Waiwhau some 18 different features were identified. These occur at varying frequencies throughout the excavation areas and trenches (Fig. 15).

Defensive features and postholes

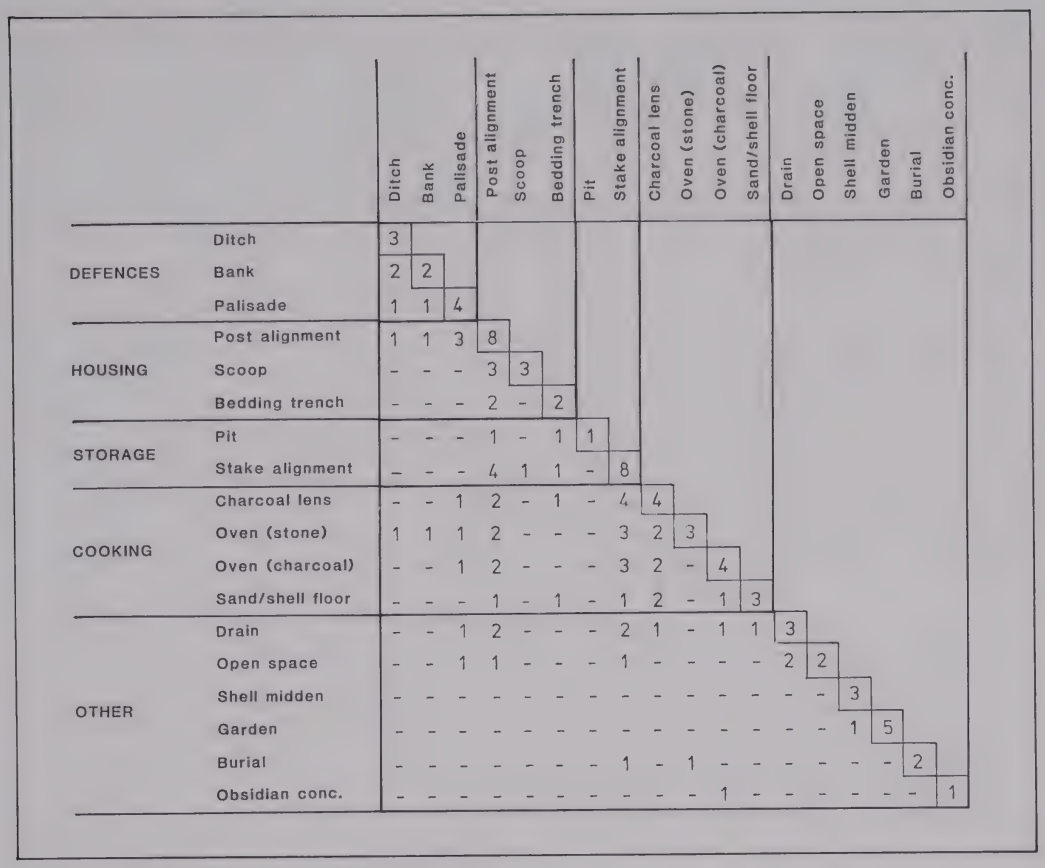
Ditches, banks and large outward-sloping postholes for palisading were all identified as defensive features. There is a close spatial association between the defences and other posthole alignments, which indicates that there were associated structures near the defences. Many other postholes were identified. Some posthole alignments away from the defences were associated with bedding trenches which supports their identification as related to dwellings or shelters. Posts also appear to be associated with oven scoops.

Stakeholes

Stakeholes were the most frequent feature encountered and they appear to be associated with charcoal lenses, hangi and sand/shell floors. This could indicate that the stones were first heated over the charcoal then transferred to the hangi, after which the rake-out was spread around. Stakehole alignments could represent associated structures, such as windbreaks and cooking shelters, with the shell/sand lens being spread as a working floor.

Other features

Drains were associated with postholes and open spaces, suggesting that they represented the border around living areas. Shell midden and garden soils were spatially separate from other features. This suggests that midden was initially dumped away from living areas, though it was often subsequently crushed when in use as an occupation floor. Gardens too, for obvious reasons, did not coincide with other features. The rest of the features only occurred once or twice and are therefore more difficult to assign.



		Ditch	Bank	Palisade	Post alignment	Scoop	Bedding trench	Pit	Stake alignment	Charcoal lens	Oven (stone)	Oven (charcoal)	Sand/shell floor	Drain	Open space	Shell midden	Garden	Burial	Obsidian conc.
DEFENCES	Ditch	3																	
	Bank	2	2																
	Palisade	1	1	4															
HOUSING	Post alignment	1	1	3	8														
	Scoop	-	-	-	3	3													
	Bedding trench	-	-	-	2	-	2												
STORAGE	Pit	-	-	-	1	-	1	1											
	Stake alignment	-	-	-	4	1	1	-	8										
COOKING	Charcoal lens	-	-	1	2	-	1	-	4	4									
	Oven (stone)	1	1	1	2	-	-	-	3	2	3								
	Oven (charcoal)	-	-	1	2	-	-	-	3	2	-	4							
	Sand/shell floor	-	-	-	1	-	1	-	1	2	-	1	3						
OTHER	Drain	-	-	1	2	-	-	-	2	1	-	1	1	3					
	Open space	-	-	1	1	-	-	-	1	-	-	-	-	2	2				
	Shell midden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3			
	Garden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5		
	Burial	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	2	
	Obsidian conc.	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1

Fig. 15. Matrix showing the association of features.

DOCUMENTARY EVIDENCE

Documentary evidence exists in the form of local histories and the Maori Land Court Minute Books to provide a background to the history and environment of the Waiwhau site.

Waiwhau and the adjacent land blocks were claimed by various individuals during the late 19th and early 20th century. The Land Court Minute Books relate a series of events involving Waiwhau, its inhabitants and the surrounding area. The maps of the land blocks add details about the type of vegetation, names, landscape and watercourses that date to this period (Fig. 8).

Ngati Hako were the original owners of the land in the district. In the 17th century Ngati Tamatera began moving into Hauraki and there were many intermarriages (Kelly 1949). Individuals generally referred to their hapu (sub-tribe) affiliations and claimed association with either the Ngati Hako and/or Ngati Tamatera tribes. The main hapu in the region of Waiwhau were Kiriwera and Te Kiko (of Ngati Tamatera) and Te Uriwha (of Ngati Tamatera and Ngati Hako).

The date of the earliest occupation of Waiwhau is unknown, but may be inferred as the late 18th or early 19th century. The first traditional reference assigns the settlement to Te Pohepohe, a chief of the Kiriwera (then known as Kahuwhitiki). This was before the battle of the combined tribes at Komata against Te Horeta, chief of Ngati Whanaunga. Later some members of Te Uriwha hapu were buried on Waiwhau. At that time Te Popo had a large house built on the site in order to make peace with Ngaiterangi of Tauranga. Some time later the chief, Tarora, of the Ngati Tamatera, was buried at Waiwhau. Te Popo then left and Waiwhau became tapu. Subsequently the inhabitants of Raupa used Waiwhau as a burial ground (Tareranui *et al.* 1878).

All these events predated the first Ngapuhi incursion into the region in December 1821, which resulted in the sacking of Totara near Thames. Raupa was occupied at this time and a successful fight against the second Ngapuhi onslaught took place there. Subsequently much of the land was abandoned as the people fled inland in fear of Ngapuhi reprisals (Mataia 1893). The Ngapuhi incursion resulted in abandonment of the region for some eight years, when the Hauraki tribes went to the Waikato. However, they overstayed their welcome there, and a series of skirmishes ended in the battle of Haowhenua at Taumatawiwi when the Hauraki people were forced to return home (Kelly 1949).

When the people returned, Raupa was not resettled; however, the Puamanuka area (south of Waiwhau) was cultivated, and Waiwhau was again used as a burial ground by both Ngati Tamatera and Te Uriwha. Shortly afterwards Christianity was introduced to these groups.

According to Tareranui *et al.* (1878), following Taraia's attack on Ngaiterangi and battles between Ngati Hako and Ngati Haua in the Waikato, a pa called Opitau was built by Te Awhe, of Ngati Hako and Te Kiko, adjacent to Waiwhau (Fig. 8). This was occupied by the combined hapu of Te Kiko, Ngati Koe and Te Uriwha. Te Hira, chief of Ngati Hako, while living at Opitau made peace with Ngaiterangi and this was marked by a big feast there. A peace was also finally made with Ngati Haua in 1842-3 (Fenton 1879).

Nearby, was a noted eel weir called Moanakapiti. It was built by Pakitahi and Te Awhe, of Te Kiko and Te Uriwha, after the Ngapuhi invasion and kept in repair by their descendants (Te Pokiha *et al.* 1878). The physical features of a ditch and bank still defined the boundaries of Waiwhau when it came before the Maori Land Court in 1905 (Nicholls *et al.* 1905).

SOCIAL INTERACTION

Social interaction with other peoples can be inferred from the items imported to the site and from historical accounts.

Imports

Much of the organic material recovered could have originated on or near the site. However, marine fish and shellfish were undoubtedly transported from some estuarine source, the nearest being the Firth of Thames at the mouth of the Waihou River, 35 km downstream from Waiwhau, and could well represent items of trade (Fig. 16).

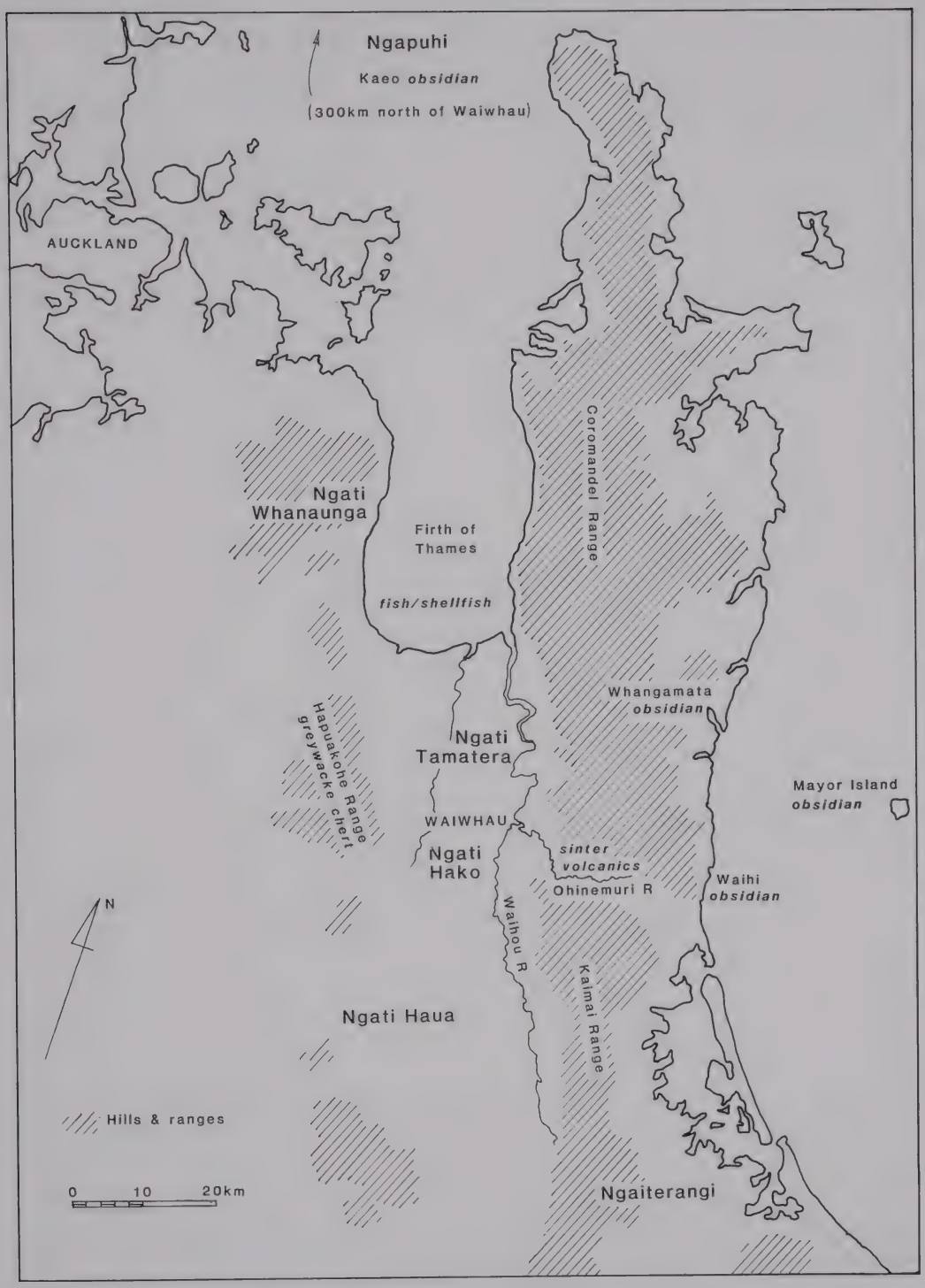


Fig. 16. Sources of stone and faunal remains found at Waiwhau, and location of tribal associations mentioned in the text.

Inorganic items included stone material and a variety of historic items. The stone came from a variety of localities, with obsidian originating from as far afield as Kaeo and Mayor Island. Clearly a much needed resource was the cooking stone which could have come from the upper reaches of the Ohinemuri. Other rock found on the site has been sourced to the southern Hunua Ranges and the Kaimai Ranges. All stone resources were imported and may be examples of trade. It is not clear whether any of the historic items were actually used by Waiwhau's inhabitants, since they all occurred in the disturbed upper layers. Some items such as nails, barbed wire fragments and shotgun pellets probably date to the time when Waiwhau was brought into pasture.

Historical accounts

The Maori Land Court records document wars with Ngati Whanaunga of the Firth of Thames, Ngaiterangi of Tauranga, Ngapuhi from Northland and Ngati Haua of Waikato. These battles and reconciliations all occurred in the first half of the 19th century, so it seems the inhabitants of Waiwhau had contact with a wide variety of tribes. Historical accounts also document individual warriors joining other taua (war parties) throughout the North Island.

The burials of both Ngati Hako and Ngati Tamatera at Waiwhau indicate a degree of contact between these two tribes though it is stressed that this only occurred after the introduction of Christianity. In addition, the genealogies cited in the Maori Land Court hearing suggest that there was much intermarriage between the two. Marriages also occurred with more distant tribes.

The evidence from the archaeological remains, together with historical accounts of warfare, marriage and burial suggest very strongly that in the early 19th century, at least, the inhabitants of Waiwhau had direct contacts with people up to several hundred kilometres away.

CONCLUSIONS

Waiwhau was constructed on levees at the confluence of the two major rivers draining the eastern Hauraki Plains. This location, at the junction of important routes up the Waihou to the Waikato, up the Ohinemuri and over the ranges to the Bay of Plenty, and downstream to the Firth of Thames, would naturally attract settlement. The area was rich in resources and included a variety of ecological zones.

Waiwhau was on slightly higher ground than the neighbouring pa of Raupa and less prone to flooding. However, whereas the soils at Raupa were well-drained sandy loams, the Waiwhau soils were less well drained silty clays. The lack of large underground storage pits at Waiwhau and the positioning of the gardens on sloping land probably reflect this fact. The soils would also have made Waiwhau unsuitable for occupation based on kumara agriculture. This may explain the apparently short occupation of the site, which may have only been utilised after the introduction of the white potato at the end of the 18th century.

The initial phases of settlement involved scattered occupation and probably included gardening. Subsequently Waiwhau was made into a pa, presumably because

of threat of attack. In the same way that Opitau was constructed in expectation of attack from Ngaiterangi, Waiwhau may have been defended in response to attacks from Ngati Whanaunga in the very early years of the 19th century. Small scale occupation and gardening continued during the defended phase. It is notable that the defended area of Waiwhau at some 5,000 m^2 was less than half the area of Raupa's internal defences and only a quarter the size of Raupa at its fullest extent. Waiwhau was also considerably smaller than the later Opitau at approximately 17,000 m^2.

After a short period the palisades were probably removed and may have been used to refortify Raupa. Marsden, visiting Raupa in 1820, made no mention of a nearby pa; however, the ditch and bank were still visible in 1905 (they finally became obscured by flood debris and ploughing in the 1930s). Raupa's defences were also removed after abandonment, possibly to fortify the later pa of Opitau. In the last phases of Waiwhau's occupation there is evidence of obsidian working as well as small scale habitation and gardening. Historically it is recorded that Te Popo built a house on Waiwhau in order to make peace with Ngaiterangi; it is possible that this occurred when the site was still fortified.

Subsequently the site was abandoned, as is indicated by soil formation and driftwood. At this time burials were deposited within the defended zone. This corresponds with the Land Court account that when Tarora was buried there the site was abandoned and it then became a burial ground for the inhabitants of Raupa and the surrounding area. The three burials in Area 4 were probably Christian. The Land Court Records state that burials were conducted on the site both before and after conversion to Christianity. Some ten named individuals are recorded as being buried at Waiwhau, but it is not known if any of these refer to the graves found.

The dispersed nature of occupation and scanty debris in comparison to Raupa, suggest that Waiwhau was occupied for a much shorter period. It was probably an open gardening settlement for most of its existence, only briefly defended, possibly by Te Kiriwera, very early in the 19th century.

While the occupation at Waiwhau may have begun with the introduction of European potatoes *ca.* 1790, it ended with the later introduction of pigs into the area *ca.* 1810. The few European artefacts found at Waiwhau were all from the disturbed top layer, and are suspected of having been incorporated into the occupation layers by the later ploughing event. This observation is in comparison to the handful of European artefacts found in the Raupa deposits, suggesting that Waiwhau was abandoned both before European goods were readily available (*ca.* 1815) and also before the latest occupation of Raupa. This is supported by the traditional records cited in the Maori Land Court, and by the lack of any mention of it in 1820 when Marsden visited Raupa.

Flatland pa are a feature of the Hauraki Plains landscape, and are often situated in the bends of the major rivers (Best 1980). The pa appear to be grouped: so that a large defensive site, which possibly acted as a major focal point for the community and was occupied for some time, is associated with smaller satellite pa, possibly occupied by related hapu, and occupied for a shorter period. Raupa was probably one of the large focal pa in the region, while Waiwhau is an example of the latter. The extent to

which this pattern was a product of 19th century warfare and economy on the Hauraki Plains is unknown. However, it is known elsewhere in New Zealand prehistory (Gorbey 1970; Irwin 1985:101-9) and may have a prehistoric basis in the Hauraki Plains also.

This work has integrated formerly well known oral history about Waiwhau with its previously obscure physical remains in a way that now makes the site part of the permanent record of late Maori settlement in the Paeroa district.

As a postscript, it can be added that owing to the discovery of burials at Waiwhau and Raupa, both sites are now seen as wahitapu by the Ngati Tamatera and all flood control measures planned by the Hauraki Catchment Board, which would have destroyed what remains of the sites, have ceased.

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Thanks go to the Ngati Tamatera for their hospitality in enabling us to stay at the Te Pai-o-Hauraki marae. Our koha to our hosts is in bringing to light the history of an almost forgotten settlement of theirs, which can again take its rightful place as a wahitapu.

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APPENDIX 1. List of wood, fruit stones and charcoal samples.

Samples 20, 36 and 29 were from Area 4i, samples 25, 52, 95, 104, 114 and 126 were from Area 4ii, and samples 9, 21 and 93 were from Area 4iii.

The majority of identified samples were charcoal fragments; other samples were wood, in the form of root material (r), degraded wood fragments (w), or post remains (p); there were also charred fruit stones (s).

Occupation phase	2	4				5				6		7
Sample number	93	95	104	114	126	25	36	52	129	9	21	20
Swamp forest												
Dacrycarpus dacrydioides	.	.	.	.	.	.	.	.	.	.	.	2r
Podocarpus sp.	.	.	.	.	.	.	.	.	.	.	2	.
Lowland forest trees												
Phyllocladus trichomanoides	.	2w	.	.	.	.	.	.	.	.	.	.
Beilschmiedia tawa	.	1s	.	.	?s	.	1	3	.	.	.	.
Metrosideros robusta	.	.	.	.	.	.	.	.	.	.	7	.
conifer	.	.	.	3p	.	.	.	.	.	.	.	.
Prumnopitys taxifolia	.	7w	.	.	.	1w	2	1	1p	.	.	.
Pittosporum sp.	.	.	.	.	.	.	1	1	.	.	.	.
Lowland forest trees and shrubs												
Vitex lucens	.	.	.	.	.	.	.	.	.	2	.	.
Elaeocarpus dentatus	.	.	1s	.	.	.	.	.	.	.	.	.
Corynocarpus laevigatus	1s	.	.	.	.	.	.	.	.	.	.	.
Litsea calicaris	.	.	.	.	.	.	.	.	.	.	1	.
Hedycarya arborea	.	.	.	.	.	.	.	.	.	1	.	.
Pseudopanax edgerleyi	.	.	.	.	.	.	.	.	.	1	.	.
Melicytus ramiflorus	.	.	.	.	.	.	1	.	.	.	1	.
Pseudopanax arboreus	.	.	.	.	.	.	.	.	.	.	1	.
Hebe sp.	.	.	.	.	.	.	1	.	.	.	.	.
Lophomyrtus bullata	.	7w	.	.	.	.	6	.	.	5	6	.
Leptospermum scoparium	.	.	.	.	.	.	3	.	.	11	3	.
Myrsine divaricata	.	.	.	.	.	.	4	.	.	.	2	.
Ferns and herbs												
Cyathea sp.	.	.	.	.	.	.	1	.	.	.	.	.
Coprosma sp.	.	.	.	.	.	.	.	1		3	2	.

APPENDIX 2. Shellfish identifications.

Total sample weight 2800-3900 g, comprising an average of 8% shell, 3% stone, 1% charcoal and 88% soil. Samples 17, 18 and 19 were from Area 4i, and samples 58 and 59 were from Area 4iii. Numbers = numbers of individuals per samples.

	Phase 4			Phase 5	
Sample number	58	59	17	18	19
Paphies australis	68	84	89	79	72
Chione stutchburyi	11	10	11	9	4
Cominella glandiformis	.	.	1	.	.
Mactra ovata	.	.	1	.	.
gastropod	.	.	.	.	1

APPENDIX 3. Fish, bird and mammal identifications.

All bone specimens were collected by hand separately and were not part of midden samples. Samples are tabled according to the phase and the location of Area 4 in which they occurred. Numbers = number of bone fragments collected.

Area 4	Phase 2 (iii)	Phase 4 (i)	Phase 4 (ii)	Phase 4 (iii)	Phase 5 (i)	Phase 5 (ii)	Phase 5 (iii)	Phase 6 (iii)
Fish[1]								
Snapper	.	.	.	1	.	1	.	.
Elasmobranch	.	1	.	.	.	.	.	.
Unidentified	2	1	4	3	1	25	.	2
Bird								
Unidentified	.	1	1	2	.	4	.	.
Mammal								
Dog	1	1	8	3	2	1	.	.
Pig[2]	.	.	?	.	.	.	.	.
Unidentified	1	.	1	.	1	2	.	.

[1] The fishbone assemblage mainly consists of vertebrae and spines; only three bones are identifiable (pers. comm. Foss Leach).

[2] Possible pig radius, not a positive identification (pers. comm. Ian Smith).